



Presented to:

Model-Based Enterprise Summit

Net-Centric Model-Based Enterprise (NCMBE) Phase 2



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Purpose and Goal



Net-Centric Model Based Enterprise

Purpose:

- This 5 year program seeks to define, develop, and demonstrate Model Based Enterprise (MBE) technologies and processes within the Army's Organic Industrial Base (OIB) and private industry to reduce acquisition costs, risks and lead times by expanding Army's capabilities in MBE techniques to capture, standardize, and reuse tech data across disciplines and throughout the lifecycle.

Goal:

- To ensure that an adequate MBE capability exists for use by existing and future programs.

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Leveraging NCMBE Phase 1



- Created processes for creating and using 3D TDPs
- Demonstration of tech data conversion from drawing centric to Model Based Definition (MBD)
- Created Standard Operating Procedures (SOPs) for creating MBD models in Pro-E, CREO, as SolidWorks CAD tools
- Created SOPs for Windchill 10.1 use at RDECs
- Published MBE Schema in MIL-STD-31000A
- Created revised set of CDRLs to procure 3D tech data
- Created SOPs for reusing 3C models in tech pubs tools to build Digital Work Instructions (DWI) and Interactive Electronic Technical Data Manuals (IETM)
- Updated MBE Capability Index

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Issues to Overcome

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- PMs currently have not adopted processes, nor do they have the infrastructure in place to utilize 3D Model Based Definition (MBD) data
- As 3D MBD becomes the norm, PMs struggle with what to do with existing flat 2D drawings
- Manually converting the 2D drawings to fully annotated 3D models is labor intensive and error-prone
 - Possible errors:
 - Human error moving from 2D to 3D
 - Blueprints are difficult to read
 - Bad legacy data (errors on original blueprint)
- 2D model data may not exist, leading to orphaned parts or critical parts that are sole sourced and manufactured without appropriate TDP



Phase 2 Tasks



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- Develop Processes for Forensic Manufacturing
- Develop Common Standard Parts Library
- Support and Provide Input to MBE Related Standards
- Develop Processes and Identify Gaps with PMs for using 3D data
- Develop MBE Technology for Identified Gaps
- End-to-end MBE implementation with an Arsenal

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Current Efforts: Forensic Manufacturing Process Development *Net-Centric Model Based Enterprise*



- Led by ARDEC with TARDEC
- DoD has situations where high-value parts need to be procured, but lack the required technical data package
 - Solution: Remove part from vehicle and create a 3D model by manually measuring and designing it in CAD or through scanning (though no standard method exists for producing certified 3D models from scanned data)
- Build upon initial PSU-ARL research on Forensic Manufacturing by building upon it to create a best practice document
- Look into scanning technologies and software, and eventually turn that research into an SOP that can be transitioned to the Organic Industrial Base

- Led by TARDEC with ARDEC
- Need emerged during preliminary investigation into 2D to 3D conversion
- Multiple 2D TDPs with different nomenclatures of common items exist across RDECs (i.e., redundant, but differently numbered)
- Establish a DoD optimum common “Standard Parts Library” and ensure that DoD agencies and OEMs are utilizing the same standard parts library and utilizing conventional process in re-using these standard parts effectively throughout the weapon system lifecycle

Current Efforts: Standards

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- Continue Army's participation with standards writing bodies to continue coordination efforts between the DoD Engineering Drawing and Modeling and Simulation Working Group (DEDMWG), OSD Acquisition Modeling and Simulation Working Group (AMSWG), and NSF Center for e-Design so that DoD's interests are represented when decisions are being made concerning standards
- Plan to continue work with S1000D, Y14.41.1, MIL-STD 31000A, and others as appropriate

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- Lead by AMRDEC with ARDEC, TARDEC, and PMs and Arsenals
- Gaps will lead to more MBE technology development needs
- Initial approach was to hold demos with the PMs to showcase various MBE tools available
- Issues preventing implementation:
 - Legacy platform with limited models being used
 - Older personnel that were experts in 2D flat drawings have limited experience with models
 - Incomplete data; Poor contracting for data
 - Unable to perform Verification and Validation for model acceptance
 - Some don't have software or technology to view models
 - Lost people with skill sets needed
- No PIF or PM is the same; No one-size-fits-all solution

- OEMs use 3D models, but DoD continues to request 2D drawings
 - Creates expensive work generating 2D flat drawings from 3D models and loss of rich data bundled in the model
- PM hurdles to overcome:
 - Don't have the contracting language
 - Don't have technology to utilize
 - Don't have the skills to utilize
- Solutions:
 - Educate and mentor PMs through their respective MBE adoption
 - Assess various PMs using the updated MBE Capability Index to determine where the PMs are in their MBE journey
 - Develop roadmaps for the various PMS to have clear implementation plans
 - Identify technologies that can be utilized readily, as well as new projects to address unique needs for each PM.

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Current Efforts: DMDII Project Call

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- Utilizing Digital Manufacturing and Design Innovation Institute (DMDII) to access members for participation in to be determined technology development with the PMs and Arsenal



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